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REVIEW OF THE

TELEGRAPH AND TELEPHONE

A JOURNAL OF ELECTRICAL, SCIENTIFIC AND MECHANICAL NEWS.

AMES.

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The Cruelty of Nature.

BY MONTGOMERY.

We are taught that nature is a living mind,
A heart of untold pity. But we know
That nature is the unweary, cruel foe
Of our courageous, suffering humankind.

It hears no prayer; it is unsouled and blind;
And we resist it, brave it as we go,
Until we die like dogs, and cast our woe
Into the darkness of the undivined.

It is a beautiful and deadly power,
Whose curse is still upon us while it gleams
Through the soft balm of tender summer noons;

Oh! I have seen it blast in one sad hour
Lives that were dearer to me than my dreams,
And worth the glory of the stars and moons.

ELECTRIC LIGHT

Science Extraordinary.

As we all know, a lineman employed by the Brush Electric Lighting Company, of New York, was killed by the passage of a strong current of electricity through his body while he was engaged in some repairs.

It was supposed that he inadvertently grasped both out and return wires at the same time. The daily papers, of course, in detailing the occurrence, naturally commented thereon at length, and, while much of their commentary was good and sensible, much more was utterly insensate, weak, and characterized by gross ignorance. The newspaper articles were scarcely worth a reply, although the New York *Herald* stated that its facts were gleaned from an eminent electrician of New York, whose name did not at once appear.

But the English electrical journals—notably the *Electrical Review* and *Engineering*—have lately noted these lurid articles of the daily press, and allude to them with some degree of jocularity, and name the "prominent electrician" of the *Herald*.

How his identity became known to the English papers is not known to the writer, but it may be presumed that some American paper printed it in full, so that honor should be accorded to whom honor was due, and both of the periodicals we have cited accord that honor to Mr. Park Benjamin, of New York.

Some of the statements thus ascribed to the gentleman aforesaid are of the most astounding character, and modern electrical science hides perforce before them its diminished head.

Let us quote his words: "For instance, I should not be surprised to see some of our firemen have a lively time some day. Let one of these wires, with its terrific current, foul a telephone wire on the roof of a burning building, or even an exposed gaspipe, with its ground connections, and supposing the fireman who holds the nozzle is standing on wet ground, if the stream from his hose should strike this wire, a circuit would be formed, and he would experience a terrible shock." Then he went on, and graphically depicted the adaptation of electricity to defensive warfare by imagining a beleaguered fort, armed only by a steam fire engine and a Brush dynamo-electric machine.

The dynamo is to have one wire connected to the ground, and the other with the water passing through the hose; and a fiend in human form, holding the nozzle, sweeps his stream with direful effect, mowing down the attacking party at the rate of a thousand in ten seconds.

That the Brush machine develops enormously strong currents, nobody can deny. Nobody wants to deny it; for currents of tremendous strength are necessary where from thirty to forty arc lights are in series.

But, while the prominent electrician fully believes in strong currents, he seems to have forgotten that different conductors have different resistances, and that a stream two or three hundred feet long differs in some slight degree from a quarter-inch copper rod of the same length.

Unfortunately for our faith in the aforesaid statements, we cannot overlook the one feature of resistance. We cannot regard all conductors as the same in conductibility. Metals are good conductors; saline and acidulated liquids by no means so good, and pure water very bad; and these different degrees are very wide apart, for, while copper is one million times a better conductor than acidulated water, it is six thousand seven hundred and fifty-four million times better than distilled water.

It is a law of electricity that the strength of current in any circuit depends not only on the power of the source, but also on the length or resistance of the conductor; and by another law the strength of the current is equal in every part of the circuit.

As a unit for the resistance of wire, we have the "ohm," which practically represents about one-sixteenth of a mile of No. 9 galvanized iron wire. A copper rod, three hundred feet long, has, therefore, a resistance of only about six-hundredths of an ohm.

The unit of the strength of current we call the "ampère." We may form some idea of the strength of an "ampère" by the knowledge that the strength of current in the average local sounder circuit is about one-fourth of an ampère.

The Brush machine is said to develop a force of 1,840 volts; this, however, varies considerably with the conditions. A volt, by the way, is about equal to the power of a Daniell cell. The current generated with such a force, in such a copper rod as we have mentioned, would be about 30,700 ampères—a current which we grant would be sufficiently strong to turn a man into a cinder, and save his friends the trouble of cremation.

But we are called upon to believe that, if we substitute for the copper rod a stream of water of the same dimensions, the current would still have the power to destroy human life. Is it so?

A stream of pure water of such a length and size, supposing it would keep intact for such a distance (which it won't generally do), would have a resistance of two hundred and eighty-five million ohms, and with the same force—1,840 volts—the current through this conductor would only be about six millions of one—a strength scarcely sufficient to make a taste in the mouth of a cheese mite.

But let us suppose for a moment that there is no such thing as resistance. What if the electricity connected with the stream of water takes a notion to follow the circuit, back instead of forward, through the stream, and through the framework of the engine to earth, instead of traversing the stream and ultimately completing the circuit through the attacking army; or supposing, to avoid this contingency, we stand our engine on a plate of glass, what if the current should adopt the capricious course of continuing backward through the stream to the source of the water, say, for example, a hydrant, leading by miles of water-pipe to earth?

Or what would become of the man holding the nozzle, in the event of the assumption by the current that he was the shortest way to earth? But, says the prominent electrician, he can wear rubber shoes. Eureka, so he can; so, also, may the fireman, who is to be incinerated, because his stream strikes an electric light wire. Allah be praised! It is a poor rule that won't work both ways. By the way, suppose the attacking general should get an inkling of the programme, and get up another corner in india-rubber, and shoe his army with that article. But the field for conjecture but grows wider with the food it feeds upon, and we must forbear. But may we not think on these things?

When an obituary notice ends, "No further seek his frailties to disclose," it means, "Whiskey killed him."—*Texas Siftings*.

Incandescence and Arc Lamps on the Same Circuit.

A short article in our last issue, sent to us by a correspondent, showed some of the disadvantages of combining the two systems of electric lighting on the same circuit. It was mentioned that one of the drawbacks was the fluctuation of the candle power of the incandescence lamps with the change of resistance in the "arc." It is evident that arc lamps in which the carbons are arranged one above the other, must all in a greater or less degree, partake of this variation. There must be many instances in which such a combined system would be advantageous, could the faults mentioned by our correspondent be avoided.

It would be interesting to know if the writer of the article referred to, had ever tried arc lamps other than those of the above-mentioned type. The Rapieff arc lamp and the Jablochkoff candle, should give very good results in conjunction with incandescence lamps, as in both the length of the arc is practically invariable, and therefore variation of resistance should be less noticeable than when the carbons are arranged point to point. The "Sun" lamp, of which the Rapieff system was the forerunner should also give equally good results. These systems, therefore, at the moment, appear to be the best adapted for a combined method of working arc and incandescence lamps. The matter of arranging the circuits as described by our correspondent, appears to us to present the greatest difficulty, and although, as before said, there are probably many places in which the combination is desirable, it does not seem at present that the two can be used together very harmoniously; it is wisest, therefore, to work each system independently of the other, and not risk a failure at a time when it is of paramount importance that all installations of the electric light should be pronounced successful.—*Electrical Review.*

New Electric Light and Telegraph Company in Pittsburgh, Pa.

Articles of incorporation have been at the Recorder's office, of the Finney Electric Light and Telegraph Company, Limited, an organization that has just been formed by a number of Pittsburgh men, for the purpose of manufacturing and introducing certain patents of Dr. J. R. Finney, the Sixth avenue dentist, relating to electric light and telegraphy. The incorporators are George Shiras, Esq., Wm. A. McIntosh, of the New York and Cleveland Gas Coal Company; Wm. Bakewell, Esq., of Bakewell & Kerr; Allen C. Bakewell, Albert Childs, Gen. C. L. Fitzhugh, of Zug & Co.; Sol Schoyer, Esq., Capt. Sam Schoyer, William Schoyer, of the *Post*, Frank Rahm, Dr. J. R. Finney, Max K. Moorhead, John W. Chalfant, Thomas B. Kerr, Esq., R. K. Wilson, cashier of the Citizens' National Bank, H. K. Weyman and the estate of Capt. Patterson, deceased. Gen. Fitzhugh is president of the company, William A. McIntosh secretary and treasurer, and both officers with John W. Chalfant, Albert Childs and Dr. J. R. Finney constitute the Board of Trustees. The capital stock is placed at the nominal sum of $300,000.

The patents which the company proposes to take up number between forty and fifty, most of them being improvements on the present instruments. One of the most important is a system of telegraphy to moving trains. A continuous wire extends over the railroad track and is so arranged that a "traveler" can move over it from one end of the line to the other. The traveler is attached to a light chain which communicates with an instrument on the train and the leak is grounded through the iron axle and wheel. An operator in the train is thus placed in communication with the despatcher's office while the train is running at its highest speed, and can be instantly apprised of danger, so that accidents by collision will be impossible.

Transmission of Work to a Great Distance on an Ordinary Telegraph Wire.

The Electro-technical Committee of the Exhibition of Electricity at Munich, having requested me to repeat upon a telegraph line the experiments on the transmission of power which I had previously made over great distances, I forwarded to Munich and Miesbach the fine wire machines which I had made use of in my laboratory experiments.

The telegraph line placed at my disposal by the administration of the German telegraphic system had a length of 57 kilometers. It is of galvanized wire 4.5 millimeters in diameter, and since, as a matter of precaution, I did not think fit to make use of the earth, I requested permission to employ a return wire identical with the former. The total length of the line traversed by the current is, therefore, 114 kilometers, and its resistance, on measurement, 950 ohms. The insulation is good, but differs in nothing from that universally employed on all telegraph lines. The two machines, situate the one at Misebach and the other at Munich, are absolutely identical, and have each a resistance of 470 ohms.

The total resistance of the circuit is, therefore, close upon 1,900 ohms. In the first experiment which was made there was immediately obtained at Munich a work of 38 kilometers per second (or about one-half horse power), at a speed of 1,500 revolutions per minute.

The generating machine, situate at Miesbach, turned at the rate of 2,200. The two machines being identical, the proportion of the work recovered at Munich to the work expended at Miesbach was, setting aside passive resistance of every kind, $\frac{1500}{2200}$, or more than 60 per cent. The machines employed are of Gramme's "atelier" type, modified according to my calculations.

A heavy rain fell during almost the whole duration of the experiments.

The receiving machine serves at present to feed a waterfall of one meter in width and three in height, by means of a centrifugal pump.

Sparks are scarcely visible on the collectors of the two machines. The heating of the machine is scarcely appreciable after two hours' work.—*M. M. Deprez.*

An Electric Orchestra.

A curious musical entertainment has been arranged at a circus in the Champs Elysées. Instruments, including bells, flutes, cymbals, drums, hautboys of special nature, &c., are placed around the circus and connected by wires with an electric keyboard in the center. There is also below the circus a machine similarly connected which gives a rumbling sound like that heard in earthquakes. A piece is performed on four trumpets in the center of the circus, and one of the performers presses now and again on the keyboard, bringing into action the distant instruments as desired. He is also enabled in the same way to produce distant detonations and ignite blue lights.

A Hot Electro-Motor.

By Signor Gandini.

The author employs an element heated at about 212° F., a cylinder of zinc in a solution of salt, and carbon in a solution of potassium chromate with sulphuric acid. The electromotive forces, E, and the resistances, R, are

Cold: E=2.10 volts. R=0.82 ohm.
Hot: E=2.44 " R=0.71 "

The polarization is smaller at higher temperatures; the element is very constant.— *Wiedemann's Beiblatter.*

Edison's Electric Light.

The following reply from the President of the Edison Company appeared in the *Sun* recently:

"To the Editor of the Sun—*Sir:* 'Investigator,' in Wednesday's *Sun*, says that the Edison Company is troubled at its Pearl street station with 'a loss of current, due to the resistance of the long circuits;' also that whereas Edison gets 'six, or even seven lights to the horse power in isolated plants, the resistance of the long underground wires reduces that result in the Pearl street station to less than three lights to the horse power.' Both of these statements are false. As regards loss due to resistance, there is a well known law for determining it, based on Ohm's law. By use of that law we knew in advance; that is to say, when the original plans for the station were drawn, just what this loss would be, precisely the same as a mechanical engineer when constructing a mill with long lines of shafting can forecast the loss of power due to friction. The practical result in the Pearl st. station has fully demonstrated the correctness of our estimate thus made in advance. As regards our getting only three lights per horse power, our station has now been running three months, without stopping a moment, day or night, and we invariably get over six lamps per horse power, or substantially the same as we do in our isolating plants. We are now lighting 193 buildings, wired for 4,400 lamps, of which about two-thirds are in constant use, and we are adding additional houses and lamps daily. These figures can be verified at the office of the Board of Underwriters, where certificates with full details permitting the use of our light are filed by their own inspector. To light these lamps, we run from one to three dynamos, according to the lamps in use at any given time, and we shall start additional dynamos as fast as we can connect more buildings. Neither as regards the loss due to resistance, nor as regards the number of lamps per horse power, is there the slightest trouble or disappointment on the part of our company, and your correspondent is entirely in error in assuming that there is. Let me suggest that if 'Investigator' really wishes to investigate, and is competent and willing to learn the exact facts, he can do so at this office, where there is no mystery or concealment, but, on the contrary, a strong desire to communicate facts to intelligent inquirers. Such a method of investigating must certainly be more satisfactory to one honestly seeking knowledge than that of first assuming an error as the basis of a question and then demanding an explanation. S. B. Eaton,

"Pres't. of the Edison Electric Light Co.

"New York, Dec. 1."

Malleable Brass.—A German periodical is responsible for the following method of making malleable brass: Thirty-three parts of copper and twenty-five of zinc are alloyed, the copper being first put into the crucible, which is loosely covered. As soon as the copper is melted zinc, purified by sulphur, is added. The alloy is then cast into moulding sand in the shape of bars.

It was only a few weeks ago that Chief Shaw, of the London Fire Department, said, while visiting in this city, that such fires as we had in America would be impossible in London. If our cable news is correct, another observation will be in order from Mr. Shaw. Two acres burned over and $15,000,000 of property destroyed is the startling announcement. We read that there was delay, too, in getting out the engines. It has been a long time since we have had trouble of that kind in New York, or have burned over two acres.

From What and How the Slender Hoops of Carbon are Made.

The Western Union Light Company received a large number of friends recently, including the leading business men of Chicago, at their fine establishment, numbers 51 and 53 Wabash avenue. The building was illuminated by 250 Edison incandescent lights, the power being generated by a single engine in the basement. The front office was illuminated by a variety of beautiful fixtures, while the large rear room sparkled like a star dome with 150 lights, each sending forth a strength of sixteen-candle power. The incandescent is a small, soft, and steady light, of good gas power in quality of brightness, and is especially adopted for domestic and industrial purposes, distinctly different from the arc light, which is one of great intensity, changing color and very trying to the eyes. The incandescent lamp consists of a pear-shaped glass globe, four and a-half inches in height, exhausted of air, into which is sealed a filament of carbonized bamboo, slightly thicker than a hair, in shape of horse-shoe, its extremities being connected with copper wire and platinum by electroplating. This filament, becoming incandescent by the passage of the current of electricity through it, emits a beautiful, soft, white light, absolutely steady and constant, and equaling in intensity, or exceeding, if desired, the illuminating power of a gas jet of the best quality. The lamp is screwed into a socket which is permanently attached to a gas or other chandelier or bracket, and contains a key whereby the light in the lamp may be turned on or off. The lamp, once screwed into the socket, needs no further attention or care until the carbon breaks, when the old lamp is unscrewed from the socket and a new one screwed in, the work of a few seconds. The lamps vary in the number of hours which they will burn, but their average life, at sixteen-candle power exceeds 600 hours of actual burning, and have burned 5,000 hours. These lamps vary in candle power from 4, 8, 16, and 32 to 100. Each light is entirely independent of the others, and may be arranged and controlled singly, in pairs, or in groups of any desired number, and may be placed in any position whatever, inverted or otherwise.

The bamboo that composes the horse-shoe is of a particular species growing in Japan. In two months it attains its height of sixty feet; in early stages it is soft and juicy, and furnishes the natives with salads, etc. In five years it hardens to solidity, and when about two years of age is in the best stage for carbonization. It is sawed between the joints into lengths of eight inches, split lengthwise sixteen times and bundled up for transportation, 35,000 trees being sent last year. Arriving at the factory at East Newark, N J., it is resplit into filaments, the proportions of which are 1-8000 by 13½-1000 of an inch. This filament is put into horse-shoe shaped nickel moulds and carbonized in a furnace of high heat, coming forth elastric and having the ring of steel.

By the Sprengler or Geisler method of producing vacuums the pear-shaped bulb could have been placed in such a state in something less than forty-five hours, but Edison, by combining the most salient points of these systems, and using a mercurial fall, exhausts a bulb to one-millionth part of an atmosphere in forty five minutes. In the manufacture of a lamp there are 105 different processes, enlisting eighty-five persons.

To measure the amount of electricity consumed, a meter is made that measures by the electrolysis of metal. Two zinc bars of equal weight are immersed in a solution of sulphate of zinc, the current of electricity transfers the material of one bar to the other, and the change of weight being ascertained the amount of electricity can be computed. To prevent freezing the meter has an incandescent light, that comes automatically into action by cold contraction, and thaws the liquid by its heat. The incandescent lights are all provided with a patent "safety catch," that in case of crossed wires or other counter currents, automatically severs connection and effectually prevents an accident. The heat generated by the light is but one-fifteenth of that produced by gas; it burns brilliantly under water, or may lie with safety in a bed of shavings or gun cotton.

A New Secondary Battery.

Some time ago we described the cheap and useful voltaic cell of Mr. Alfred Bennett, which consists of a zinc plate and an iron plate surrounded with iron filings; both being immersed in a solution of caustic soda. For convenience the iron plate is sometimes made in the form of a containing vessel, as it is the negative metal in this combination. Quite recently, Mr. Thomas Farrington, has employed this cell with good results as a secondary battery or accumulator. He has altered the cell slightly by using rusty iron in preference to clean iron in order that the oxide might be reduced to spongy iron by the hydrogen evolved. The result was that the cell gave a very constant current for some time, zinc, oxide and spongy iron being formed in its direct or primary action. When employing the cell as a secondary battery, the reverse action takes place, and the zinc oxide is reduced to metallic zinc, whilst the spongy iron is oxidized. The cell is further improved by using carbonate of soda instead of the caustic soda solution, and Mr. Farrington yet hopes to find a neutral salt which will give still better effects.—*Ex.*

The French minister of Marine has appointed a commission to investigate and report upon a new arrangement for illuminating submarine operations. A powerful arc lamp is enclosed in a water-tight casing, the bottom of which is formed of a glass plate, and the top is provided with a reflector that will distribute the light over a circle about 100 ft. in diameter. The series of experiments, which it is intended shall be very complete, will be conducted at Marseilles. The divers will be in telephonic connection with the surface, and be able to direct the movements of the lamp, which will be suspended over the operations and can be shifted at will.

Awards at American Institute.

The following awards were made to exhibitors at the American Institute Fair, New York, which closed Dec. 9th:

Medal of superiority (bronze), to U. S. Illuminating Company, New York, Incandescent Lighting.

A. G. Newman, New York, Burglar Alarms, etc.

Rousseau Electrical Works, New York, Burglar Alarms, etc.

Smith & Rhodes, Electric Company, New York, Gas Lighting Apparatus.

Jerome Kidder Manufacturing Company, New York, Electric Batteries, etc.

Electro-dynamic Company, Philadelphia, Dental Engine.

Medal of excellence (bronze), to J. & H. Berge, New York, Electro Static machines.

U. S. Illuminating Company, New York, Arc Lights.

Cumming & Brinkerhoff, New York, Periphery Contact Disc Electrodes, for telegraphs.

W. F. Sheridan & Co., New York, Telephones, etc.

Electro-dynamic Company, Philadelphia, Electric-motor.

John Chandler, Block and Signal System.

C. E. Zimdars, New York, Pneumatic Bells, etc.

George F. Richter, New York, Speaking Tube Whistle.

Rousseau Electrical Works, New York, Gas Lighting Apparatus.

Diplomas were awarded to W. D. Schooley, Richmond, Indiana, for Gas Lighting Apparatus.

The Applegate Floor Mat Alarm Company, New York; the Utica Fire Alarm Telegraph Company, and to John Butler, M. D. for Electric Message Instrument.

It is perhaps well to mention that there were but five (5) silver medals awarded out of a total of 544 prizes, the fortunate recipients being Alva Pearsall, Portraits; Riehl Bros, Testing Machines; Farrell & Marsden, Ore Crusher; Anton Dobler, Malt Mill, and John P. Lindsay, Safety Pin Machine.

The Westinghouse Machine Company, (whose engines were employed in running the dynamos for the Arc and Incandescent lights) were awarded the medal of excellence, which was also received by the New York Safety Steam Power Company, by Thos. J Fales, agent, for engines and by Rufus Chandler for water motor.

Robert Whitehill received the medal of superiority for steam engines.

The management announces that their labors have been crowned with financial success to the Institute, in spite of their enormous expenses, which were upward of $25,000.

It appears from Census Bulletin No. 304, that the number of mechanical and manufacturing establishments in the United States is 253,840, and the amount of capital invested is $2,790,223,506. There were employed an average of 2,738,950 persons, and $947,-919,674 were paid as wages during the year. The value of the materials used was $3,334,350,029, and of the products $5,369,667,706. The value of products, therefore, exceeded the sum of wages and value of materials by $1,027,398,003. There are sixty-seven varieties of industry reported The twelve most important in values are the following: Flouring and grist-mill products, $505,161,712; slaughtering and meat packing, $303,562,413; iron and steel, $296,557,685; lumber sawed, $233,268,729; foundry and machine shop products, $214,331,668; cotton goods, $210,950,383; men's clothing, $209,538,460; boots and shoes, $196,920,481; woolen goods, $160,-606,72[illegible]; sugar and molasses refined, $155,484,915; leather tanned, $113,349,617; malt liquors, $101,058,-385. Readers of this bulletin are reminded in some preliminary remarks that it does not include fishery products, gas manufacture, petroleum refining, mining, quarrying, and manufacturing by steam railroad companies; and that in the leather industries some establishments engaged in both tanning and currying are duplicated

The Original Reis Telephone.

That Philip Reis, the inventor of the first telephone, intended to transmit speech by it electrically, is often doubted; and in the late telephone decision, Mr. Justice Fry came to the conclusion that from the evidence before him, he did not But further investigation seems to show that Reis did design his apparatus to transmit speech, and not merely as a musical telephone. He showed his first apparatus at the Physical Society of Frankfort in 1861, and he then stated that he had been considering how to devise an instrument for transmitting human speech. He had chosen as his model the human ear, and the apparatus shown was a rude representation of the outer ear in wood, with a tympan or drum of bowel gut, having a bent platinum wire to represent the malleus, and an adjustable platinum contact. This original Reis telephone was exhibited by the Physical Society on Saturday last, by Professor S. P. Thompson who brought forward ample evidence to show that Reis's instrument did actually transmit some words, as it was intended to do.—*Engineering, London.*

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At a recent agricultural exhibition at Ledenburg, in Germany, was exhibited a threshing machine which was driven by electricity at the rate of 1,400 revolutions a minute and which at the same time illuminated the inclosure in which it worked.

The New York and Pennsylvania Telephone and Telegraph Company recently organized with a capital of $50,000 (authorized capital $1,000,000), with its principal office in New York city. It has over 1,500 stations and several hundred miles of extra territorial lines in its territory. It embraces the territory formerly covered by the Elmira Telephone Company, The Steuben Telephone Company and the Southern New York Bell Telephone Company; and Ithaca, Jamestown, Dunkirk, N. Y., Bradford, Corry, Olean and Warren, Pa. The Incorporators are Charles F. Cutler and Joel C. Clark, South Framingham, Mass., Henry L. Storke, Auburn, N. Y., Wm. N. Estabrook, and Francis E. Fitch, Elmira, N. Y. The officers are as follows: Charles F. Cutler, President; H. L. Storke, Vice-President; J. C. Clark, Secretary and Treasurer; Wm. N. Estabrook, General Manager, with headquarters at Elmira, N. Y.; principal office, New York.

General C. H. Barney, General Superintendent of the New Jersey Telephone Company, is about to leave the company. General Barney took charge of the New Jersey and Westchester Telephone Companies' territory January 1, 1882. There were then eight exchanges, with 773 subscribers. Under General Barney's energetic management the plant has increased to sixteen exchanges, and the subscribers numbered on November 1st, 1,719. The regular growth is now about 100 subscribers per month. During the past season 5.319 new poles and 954 miles of wire were put up, and the service has been systematized and improved in every respect. General Barney has sent in his resignation. The news was received with great grief by the employes in the Jersey City Exchange, and on Saturday afternoon they expressed their love for their superintendent by presenting him with an elegant ice pitcher and service. Mr. C H. Benson made the presentation speech on behalf of the employes, and General Barney feelingly responded. The gift is very beautiful. On the cover of the swinging pitcher is engraved the legend: "Presented to Gen. C. H. Barney by the employes of the Jersey City Exchange, Nov. 25th, 1882." The young ladies of the Exchange participated in the gift.

We were favored with a pleasant visit a day or two since from General Manager Allen, of the Mexican Pacific Telephone Company, whose headquarters are at Mazatlan. This Company, now operating Lower California and the Pacific States of Mexico, has already made considerable progress in telephone business in that country. Mr. Allen is a thorough electrician and an energetic worker; he is also introducing the electric light in the principal cities along the coast.

The Edison Electric Light Company, for isolated lighting, has declared a dividend of 10 per cent. out of the earnings of the first year.

One of the best evidences of the activity and demand for electrical supplies and apparatus is furnished by the fact that the well-known manufacturers, Messrs. Post & Company, of Cincinnati, O., have found their electrical business growing to such large proportions that they have been compelled to organize it into a separate company, which department will be known, after the first of the year, as the Standard Electrical Works of Cincinnati.

Messrs F. E. Beardslee and James Fagan, Electricians and Telegraph Engineers, located in the city of Mexico, made us an exceedingly interesting call yesterday and gave us many points of interest concerning electrical matters in their country. Their report of the new Electric Light and Telephone interests were especially favorable.

A Point in Night Alarms for Telephone Exchanges.

We all know, at this advanced stage of telephonic art, that a night alarm apparatus is frequently used in connection with switchboards, for exchanges which are not large enough to support an attendant constantly on duty through the long hours of the stilly night.

One of the forms of alarm in most frequent use is that in which a metal bar is stretched across the switchboard in front of the annunciator drops, a little above their point of rest, on which the drops fall when a call comes in.

A wire runs along the switchboard connecting all their metallic bases together, and is also connected with one pole of a Leclanche battery of one or two cells; a wire connects the metal bar on which the drops fall to one terminal of a bell alarm, and the other terminal of the bell is united by wire with the other pole of the battery. Of course the fall of any one of the drops completes the circuit, making the bell ring.

The writer believes that he first introduced this form of alarm, and he was wont to lead the circuit through the iron braces of the switchboard, to the delight of the central office employés and the wonderment of their friends.

But there is an innate deviltry in telephonic apparatus, and this form of alarm, simple as it appears, and simple as it is, is not devoid altogether of the depraved tendencies aforesaid.

All who have employed it have doubtless noticed that in some switchboards, as soon as the alarm is put into operation and a call signal comes in, the drop of some special annunciator is invariably followed immediately by the fall of one, and sometimes more than one, other drop. Many of those who have noticed this exhibition have not rested until they have found the reason of the phenomenon, and they of course will not care to be again informed. Many more, however, are probably still wondering why it occurs. The reason, when we once stumble on its track, is a very plain one. It is obvious that there must be, to produce the trouble, some undue intimacy between the annunciator that always falls and the others, and a little thought will bring the conclusion that the intimacy must be fostered by the wire that connects the bases of all the annunciators, since that is the only link connecting them together; and such is the case. The question will then occur, why should only a few of the annunciators be so sympathetic? The cause is that those that are so susceptible are diseased. In language that is plain, their cores are in electrical contact with their coils; in winding, a little of the silk covering has been rubbed off in that layer of the helices next to the core.

No obnoxious result accrues from this until the alarm is attached. If all is right, and there are no diseased annunciators, when a drop falls the current of the local battery will instantly begin to circulate, leaving one pole of the battery it passes along the wire which connects all the bases, then by means of the fallen drop, the metal bar, which stretches in front of the drops, then to the bell, and through the magnets thereof to the battery, the bell beginning to ring, and continuing to ring, either until the sleeper is awakened or till the battery is exhausted. We are credibly informed that cases of the latter nature have occurred.

If, on the contrary, as too often happens, two or more of the annunciators have their cores on speaking terms with their coils, and either of the drops so troubled falls, the alarm current flows as before, through the fallen drop and bell. The calling current, however, which is generated by the subscriber's magneto bell has, on its arrival at the central office, two routes, one through its own annunciator helix to the ground plate, the other through a portion

of its own annunciator coil, thence to its own core, along the wire connecting the metal bases to the other faulty annunciators, and from their cores to and through their coils, to ground either at the central office or along the line, most likely the former; the result being, as might be expected, the fall of all the defective drops.

This only is the witchcraft used: the only radical remedy is to change the annunciators for good ones.

A new book, of considerable interest to electrical people, has been published recently by Mr. Charles E. Buell, of Washington, who has been for two years compiling information on the subject of secondary batteries. He has descriptions of storage batteries charged by light, by frictional electricity, by atmospheric electricity, by the earth, and two forms that charge themselves. Mr. Buell thinks the republication of these experiments may be of use to electricians and inventors

The following interesting article was unavoidably crowded out of last edition:

The Electric Storm.

Commencing on the morning of Friday, November 17th, and continuing with more or less intermission until the morning of Monday, November 20th, one of the most widely extended and powerful electric storms observed since the introduction of electric telegraphy prevailed.

Much trouble was experienced with nearly all telegraph lines throughout the country, and during Friday morning when the storm was at its height, scarcely a single wire could be worked between Boston and New York. The telephone lines were also much troubled, the annunciators constantly falling, owing to the charging of their magnets by the powerful earth current

There was a brilliant display of the aurora borealis during each night of the storm, and very likely each day too, but of course the sunlight would (during the day, outshine the aurora and prevent it from becoming visible.

Every thinking mind will connect the display of the aurora with the other effects of the electric storm. Scientists, who have given this matter the closest attention for years, cannot give an authorative explanation of either phenomenon; but this much is known, that these exhibitions of aurora, and the electric storms by which telegraphers and electricians are sometimes annoyed, have some mysterious connection with the sun, as it always happens that when the surface of the sun's disk is most disturbed and most covered with spots, we can surely rely upon the appearance of the annoying earth currents and the glorious fireworks of the heavens.

The spots on the sun have been discovered to have eleven year periods; and it has been noticed that the prevalence of auroras and intense earth currents, coincide with the same periods.

Attempts have been made to analyze the auroral light with the spectroscope; and it has been shown to be due to gaseous matter; but its composition has not been traced to any known terrestrial substance. Considering the earth as a magnet, it has been repeatedly observed that the lines of the aurora carefully follow the earth's lines of magnetic force, which spread out into its atmosphere, just as the lines of force of any other magnet do when made visible, by iron filings spread over the magnet on a card; and we may, therefore, in want of a better theory, assume the aurora and its flashes to be the discharge along the earth's lines of force between its magnetic poles, of the unusual amount of electricity generated within the earth when the sun is disturbed; the currents which simultaneously make their way into our telegraph and telephone lines being, of course, due to the same original cause, whatever that may be, and traversing the said wires merely from ground plate to ground plate, simply because that alternative way is presented to them as a parallel circuit with the crust of the earth, between any two given points.

Some one will, no doubt, say or think: Why should the electrical discharges of the earth follow the lines of force? When an electrical discharge takes place through rarefied gas in the field of a magnet, it is concentrated in the magnetic forces, which are the only paths in which it can move without being disturbed by the magnet; and the rarefied atmosphere through which a discharge between the poles of the earth must move, may be regarded as forming substantially the same conditions.

Supposing that the foregoing ideas are correct, we still have given no cause for the origin of such an enormous surplus of electricity in the substance of the earth, as to require all the electric wires spanning its surface as additional means of conveyance, and to warrant such a degree of tension as a discharge between the poles would call for, and this we now undertake, although the hypothesis we give is somewhat of a speculative character.

As we have already observed, nearly everybody knows nowadays that our earth is a magnet; but who will tell us why it is a magnet? May we not reasonably suppose that it is a magnet, for the same reason that the armature of a magneto machine is, *i. e.* because it is within the field of a greater magnet. If we cause an armature to rotate rapidly on its axis, when in the sphere of influence of a magnet, constantly recurring currents are induced in it; a familiar instance being the well-known telephone bell (magneto call bell).

But if we regard the earth as the rotating armature, where is the inducing magnet? Where, or what, but the sun itself? The only body in the whole solar system capable of exercising inductive action upon the earth.

The sun appears to possess powerful electrical powers; its very light evidently being due to the same causes which produce the electric light; the only artificial light which emulates the light of the sun. Let us then regard the light of the sun as a huge dynamo electric machine of which our earth is a rotating armature, *always* rotating, and consequently *always* generating electrical currents, which, of course, then are constantly circulating in the attempt to produce equilibrium.

The regular currents which are thus constantly generated, we may further suppose, to cause no apparent disturbance, or rather no abnormal disturbance, either as auroras or earth currents, for the reason, that not being of unusual strength, they flow off quietly through the substance of the earth, and become neutralized. But if the strength of the inducing magnet (that is to say the sun), becomes from some reason, unduly augmented, as appears to be the case when the sun spots are large and frequent, during the eleventh year, thee lectromotive force of the earth currents is correspondingly increased, with the results we have noticed during the past week. We give our ideas on this subject for what they are worth, and must confess that although now we may *speculate* much, we as yet *know* but little on this most interesting subject; yet we may hope that the rapid progress which the last few years have witnessed in the realms of magnetic and electrical science, and in the domain of scientific knowledge, may soon be extended to the subject now before us, and that we shall see in the aurora fresh evidence of the universal reign of the forces of nature, and that these same forces which cause hurricanes and tornadoes in the torrid atmosphere of the sun, thrill sympathetically to the outermost pale of the solar system in waves, not only of light and heat, but also of magnetism and electricity.

In September, 1851, there was an aurora which took possession of all the lines of New England, putting, for the time, a complete stop to business.

On the 19th of February, 1852, there occurred another, which operated the chemical telegraph of Bain, which was then in use in New England, with considerable ability, producing untranslatable celestial messages, in heavy blue lines on the chemically prepared paper.

In 1859, an electric storm, and aurora, of remarkable strength, appeared, and during its continuance, many lines of telegraph were worked by the earth currents alone.

In the second case mentioned, the alternating character of the currents was incontestably demonstrated by the fact that some of the pulsations colored the paper blue, while others exercised a bleaching effect.

Hydrogen Peroxide in Galvanic Cells.

Last autumn Mr Landolt mentioned in the Physical Society of Berlin, that nitric acid in Bunsen and Grove cells might be replaced by hydrogen peroxide. Such an arrangement would be highly advantageous, the vapors given off by the nitric acid of a cell being very objectionable. Since the above date Mr. Arthur Kœnig, of Berlin, has made careful experiments to ascertain the efficiency of these new Landolt cells. He had at his disposal the common solution of hydrogen peroxide offered in commerce at a price of 1s. 10d. per pound. This liquid is water containing 2 25 per cent. of pure hydrogen peroxide. Mr. Kœnig measured the electro-motive force of his cells according to Du Bois Reymond's compensation methods, taking the electro motive force of an ordinery Daniell cell, with its zinc in a concentrated solution of sulphate of zinc, as a unit of measure corresponding to 1 deg. in the following calculations. For his Bunsen and Grove cells he employed nitric acid of 1.33 specific gravity, and sulphuric acid with 10 per cent. of concentrated acid. The electro-motive force of the Grove cell, measured immediately after filling the cells, was 1.74 deg.; after standing for twenty minutes with open circuit it was 1.72 deg., and after another fifty minutes with closed circuit 1.65 deg. Another cell of exactly the same dimensions, but having the platinum foil in the above mentioned hydrogen peroxide solution instead of nitric acid, was then examined at the same intervals; the corresponding figures were 1.43, 1.38, 1.21 deg.; this peroxide solution is, of course, a bad conductor. It was afterwards found that the Grove-Landolt cell offered a resistance between four and five times as great as the Grove cell. If, however, one-tenth of its volume of sulphuric acid was added to the peroxide solution to increase its conducting power, only 1.33 per cent. of hydrogen peroxide of the original 2.25 per cent. could be determined at the end of the experiment, whilst in the former experiment, without sulphuric acid, the percentage of hydrogen peroxide had only been reduced to 3.16. If no sulphuric acid, which is likely to decompose the hydrogen peroxide, was introduced and the zinc placed in a concentrated solution of sodium chloride, this same percentage was found to be 1.53. A Bunsen cell was then experimented upon and measurements were again taken at the same intervals; the values of the electro-motive force were 1.67, 1.64, 1.50 deg., and after being kept with an open circuit for twenty-four hours, it was 1 43 deg The corresponding Bunsen-Landolt cell gave the figures 1.41, 1.40, 1 32 deg.; 1.26 per cent. of hydrogen peroxide was then left. If we compare the two efficiencies we perceive that fifty minutes action deteriorated the Bunsen-Landolt cell far more than the Grove-Landolt cell, the figures before and after the closing of the circuit being 1.72, 1.65, 1.40 and .98 deg respectively. The addition of sulphuric acid for the purpose of making the hydrogen peroxide solution a better conductor, proved, in the Bunsen-Landolt cell, more destructive to the hydrogen

peroxide, of which only .70 per cent. was found undecomposed at the expiration of twenty-four hours. The evidence is sufficient to show that the electromotive force of the Landolt cell is not considerably less than that of the respective ordinary cell, but that the currents are not nearly so constant and that they thus lack the one quality that particularly recommends Bunsen and Grove cells. The results cannot, therefore, be considered as favorable so long as hydrogen peroxide remains so expensive a material. Theoretically the production of this somewhat mysterious substance looks simple enough. An ordinary metal oxide and an acid give together a salt, and moreover water, or hydrogen oxide, contains two parts per weight of hydrogen to one of oxygen. A superior peroxide, with one atom of oxygen in excess, ought similarly to give a salt and hydrogen peroxide, consisting of two parts of hydrogen and two parts of oxygen. In accordance with this theory, hydrogen peroxide is obtained by mixing, for example, barium peroxide and dilute sulphuric acid; but the quantity remains much below the estimate, and the process involves great difficulties. The chief reason for this is to be found in the instability of hydrogen peroxide.

Telegraphic.

Privacy of Western Union Dispatches.

The Executive Committee of the Western Union Telegraph Company, at their last meeting adopted the following resolutions:

Resolved, That the imputation that officials or other persons connected with this company have the privilege to inspect messages passing over its wires, or through its offices, is without foundation in fact.

Resolved, That any officer, clerk, operator, or other employee handling messages, who shall report or divulge the contents of such messages to any officer of the company or other person, shall be promptly dismissed from the service of the company, and prosecuted under the law making it a penal offense to divulge the contents of messages.

Canadian Telegraphs.

The great Northwestern Telegraph Company propose laying a submarine cable in Lake Superior under the charter of the company, to connect Fort William, Manitoba, with Ontario. The telegraphic system requires six hundred miles of line, with a cable, and another link along the Canada Pacific Railway, over the Rocky Mountains, together with the existing system in British Columbia. Telegraphic communication on Canadian soil and waters, from ocean to ocean, would thus be secured. The proposed line for the laying of the cable is from some point on the Indian Peninsula, northwest of Owen Sound, connecting with land lines along Manitoulin islands, and small cable links to Sault Ste. Marie, thence by one cable through Lake Superior to Thunder Bay. The estimated cost of the cable is $400,000.

Proposed New Telegraph Line.

Mr. Vidal, an official in the Ottoman Telegraph service, has arrived in Egypt, and has asked permission of the Egyptian Government to establish telegraphic communication between Constantinople and Hedjaz by way of the Soudad.

Telegraphs in the North-West.

TORONTO.—At the annual meeting of the Great North-western Telegraph Company, Erastus Wiman, of New York, was elected President, and William Gooderham, of Toronto, Vice-President. A committee was appointed to consider a project for laying a cable across Lake Superior.

The Mutual District Messenger Company, of Boston, organized by Mr. H. W. Pope, of this city, is attracting considerable attention by the rapidity of its construction, and the magnificence of its offices, and the neat appearance of its messengers.

The Boston papers have devoted considerable space to its business, and the prospects are decidedly favorable for the company. The Messenger Company has a working contract with the Mutual Union Telegraph Company covering a period of several years.

The old State-house basement has been leased, after a contest with the city officials of two months' duration, and both companies have fitted up their offices in mahogany and cherry with everything to correspond. The location is admitted to be the best in the city.

Railway Telegraph Superintendents.

Some twenty-five superintendents of telegraph of prominent railroads in the United States met in Chicago on Nov. 20 and 21, and formed an association, having for its object the improvement of the telegraph service on railroads. The association proposes to meet yearly or oftener, on call of the president, in that city, for the purpose of discussing subjects pertaining to railroad telegraphy, such as how to secure perfect working wires; the best and cheapest method of conducting telegraph lines; train order signals and electric safety signals; electric light and telephones as applied to railroad service, etc. Superintendents of telegraph, chief train dispatchers, and chief operators may become members of the association.

Among those present at the meeting were J. F. Morgan, Chicago, Burlington and Quincy; C. S. Jones, Illinois Central; J. H. Hill, Kansas City, Lawrence and Southern; C. Selden and G. C. Kinsman, Wabash; C. W. Hammond, St. Louis, Iron Mountain and Southern; G. H. Thayer, Northwestern; W. K. Morley, Chicago and Alton; George E. Simpson, Milwaukee and St. Paul; O. C. Green, Northern Pacific; C. C. Weed, Michigan Central; P. W. Drew, Eastern Illinois; N. B. Leonard, Chesapeake and Ohio; H. C. Hope, Chicago, St. Paul, Minneapolis and Omaha; J. W. Fortune, Grand Trunk; R. B. Wolseley, Vandalia; and William Kline, Lake Shore and Michigan Southern.

The following officers were elected: President, W. K. Morley, Chicago and Alton, Bloomington, Ill.; vice-president, William Kline, Lake Shore and Michigan Southern, Toledo, O.; secretary and treasurer, C. S. Jones, Illinois Central, Chicago.

The Brooklyn District Telegraph Company have started off under most favorable auspices. The old District Company has reduced the rent of their call boxes from $2.50 per month to $1.25. So far the new company is meeting with every encouragement from the public, who seem to send in their orders liberally.

Science Lectures.

On Saturday evening, November 11th, a lecture was delivered to a very crowded audience (many being unable to obtain admission), at the Working Men's College, Great Ormond street, London, by Mr. William Lant Carpenter, B.A., B.Sc. (Lond.), on "The Telephone, Microphone, and Photophone." Sir Henry Lefroy, R.A., ex-governor of Tasmania, presided, and in introducing the lecturer, spoke of that gentleman's personal experience of the working of the telephone, &c., in America, Australia, and New Zealand.

Mr. Carpenter commenced with an exposition of the elementary principles of wave motion, and the propagation of sound by it through solid liquid, and gaseous media. In this connection he reminded the audience of Wheatstone's telephonic concert in 1855, at the Royal Polytechnic, the closing of which he deeply regretted (applause). A drawing of this, illustrating the transmission of musical sounds from the basement to the topmost story of the building, was projected (as were numerous other photographs) upon the screen. String and other toy telephones depended on the same principle. The telephone of the present day, however, was electrical, and depended on the close relations between electricity and magnetism. The statement that "the transfer of electricity always produces magnetism, and the motion of a magnet always produces electricity," was explained and actually demonstrated by experiments projected on the screen. It was then pointed out that the earliest electrical telephone, that of Reis (1852), transmitted musical *tones* only, and that its action was due to the fact that soft iron emitted a sound when temporarily magnetized. The first electrical transmission of articulate speech was achieved by Alexander Graham Bell, in 1876. Mr. Carpenter gave a very interesting sketch of the steps by which his friend, Mr. Bell, was led to a solution of this problem, which grew out of an entirely different line of research, viz., the construction of instruments which should graphically record sounds in such a way as to assist in teaching deaf mutes to speak, and began with Kœnig's manometric capsule and a rotating mirror to analyze the flame-images. The action of Bell's telephone depended on the following principles:

1. The passage of sound through the air in waves, causing an iron disc to vibrate mechanically.

2. The alteration in the condition of a magnet by any change in its "field" *e.g.*, by the vibration of the iron disc in front of one pole.

3. The excitation of undulatory electric currents in a coil of wire surrounding such a magnetic pole.

Details of the construction of the instrument were given, as well as of the series of changes involved in its use, both as a transmitter and receiver. The microphone was then explained and its application to the construction of telephonic transmitters, and the lecturer thus led up to the subject of telephone exchanges, upon which he spoke at some length, contrasting their rapid development in America with their slow adoption in this country. The recent rapid extension of their use in New Zealand, as shown in official reports he had just received from there, was commented on, and Mr. Carpenter incidentally recounted a conversation held between Wellington and Napier, 232 miles apart, with ordinary Blake transmitters and Bell receivers over railway lines near wires conveying battery currents. He also mentioned several other telephonic feats that had occurred within his own personal knowledge, and then passed on to the consideration of the photophone.

As the action of the microphone depends upon alterations in the electric resistance of pieces of carbon by air-waves of sound, so the action of the photophone depends upon the fact that the electric conductivity of (the rare element) selenium, is altered by rays of light falling upon it. Details were given of the construction of the instrument. The transmitter consists of a thin, flat mirror reflecting a steady beam of parallel rays of strong light. Speech uttered near the mirror causes it to shake, producing vibrations in the reflected beam also. At the receiving station these beams are collected by a parabolic mirror, and concentrated upon a selenium cell, through which an electric current is passing, a telephone being also included in the circuit. Variations in the beams received from the distant station produce variations in the intensity of the current passing through the cell, and these are converted by the telephone into a series of sounds. Thus articulate speech can be transmitted by variations in a beam of light, without the intervention of any conducting wire, and by these means, using a beam of sunlight, speech had been reproduced at distances measured as yet only by hundreds of yards. In its present stage, therefore, this mar-

velous instrument was more scientifically interesting than practically useful.

President John G. Moore, of the Mutual Union Telegraph Company, and John C. Rieff have asked, and the Attorney-General has granted their request, to join Joseph P. Greaves in his application praying the Attorney-General to begin, in the name of the people, an action to vacate the charter of the Western Union Telegraph Company and wind up its affairs.

An acceptable holiday gift for your friend in the Telephone, Telegraph or Electric Light business: A year's subscription to the REVIEW OF THE TELEGRAPH AND TELEPHONE, $2.00

Telephonic.

At a recent meeting of the Board of Directors of the Mexican Telephone Co., it was decided, after careful consideration, that the company should build and operate the exchange in the city of Guadalajara. The work is fairly under way there, and 150 subscribers will soon be in communication with the exchange. Some of the smaller companies on the West coast, following the example of their predecessors in the States, have combined for more effective working, and have consolidated into a large company, the name of which is the "Mexican Pacific Telephone Co.," which comprises the States of Sonora, Sinaloa, Colima and Lower California. Rentals have been raised in the City of Mexico, where $5 per month is now obtained.

We are under obligations to Special Agent F. B. Knight for the account of the thrilling adventure of Mr. Smith and himself in a severe storm on the prairie, and we hope to receive at an early day a sketch of his adventures in the Rocky Mountains and among the Mormons, which will enable us to satisfy the promises made to our eager readers.

The mouthpiece of the telephone may be perfectly respectable, but there are a great many things said against it.

Articles of incorporation of the New York and Pennsylvania Telephone and Telegraph Company have been filed in the County Clerk's office. The new company is to construct, own and maintain a line or lines of electric telegraph between this city and Erie, Pa., the principal cities on the route being Elmira and Binghamton.

At a meeting of the Board of Trustees of the incorporated village of Cold Spring, N. Y., Messrs. Lawson, Huestis, McAndrew and Mosher present, it was unanimously moved and carried that the Hudson River Telephone and Telegraph Company have the privilege of putting up poles for the completion of their works in the village of Cold Spring.

The City and Suburban T. and T. Co., of Cincinnati, has just completed the placing of an ærial telephone cable between that city and Newport, Ky. The cable was made by the Western Electric Company, is two thousand feet long, and contains fifty conductors.

The Toledo Telephone Central Office.

The telephone was introduced into Toledo, Ohio, in June, 1878, by the Bell Company, and within a very short time thereafter, the Western Union Telephone Company started the Edison system. During the Telephone war which ensued, Toledo was one of the hottest fray centers. Consolidation in due course followed the mutual arrangement between the Western Union and National Bell Telephone Companies.

From the inception of the Toledo Exchange, until August, 1880, the management was in the hands of Mr. J. M. Wheeler; since that time Mr. H. N. L. Bernard has held the ribbons for the Midland Telephone Company, which owns also a majority of the telephone exchanges of Ohio. Mr. Bernard was formerly General Manager of the Dayton Telephone Co., and his ability, perseverance, and energy exhibited there, were primarily the cause of his appointment to Toledo, which at that time needed a strong hand. His success at Toledo has fully warranted the selection, and to-day Mr. Bernard can point with pride to a subscription list of over 500, which has increased, in the face of higher rates, as the best proof of his suitability for his position.

The exchange office has lately been moved from the "First National Bank Building" on Summit Street, to the corner of Adams and Huron Streets, where it now has comfortable and commodious quarters.

The switchboard used in the new exchange, is the Multiple board, which is manufactured by the Western Electric Company.

In it, no matter how many switchboaads are in use, the terminals of every line are on each board, and within the reach of every switchman, so that it is not necessary to hold communication between section and section, as in the old system.

The tower has accommodations for 2,000 wires, and entering, the line wires, which are No. 14 steel, are led first to the lightning arresters, passing from them to the top of the cupola, where they are formed into cables of 106 wires each, which lead into the operating room.

The calling currents are generated in the daytime by a magneto machine, rotated by a water motor; and during the night by twenty cells of gravity-battery, the battery current being reversed by an automatic pole-changer.

Each of these instrumentalities are connected by branch wires to all necessary points, where, by suitable keys, they may be connected with any subscribers line, for the purpose of ringing his bell.

Toledo is connected by telephone wire with the following cities and towns: Detroit, Port Huron, St. Clair, Mt. Clemens, Ypsilanti, Ann Arbor, Tecumseh, Adrian, Marine City, Roseville, Leesville, Delhi Mills, Dexter, Base Lake, Salina, Windsor, Monroe, Flat Rock, and Kelsey. A line is also contemplated, connecting Toledo with Sandusky, and will probably be in operation next spring.

Subscribers may talk with Detroit for 25 cents, while non-subscribers are charged 35 cents. There are six public telephone stations in the city, where non-subscribers may at any time send messages, on the payment of ten cents.

Complaints of circuit troubles are made to the manager or chief operator, who enters the reported nature of the trouble and the time it was reported, in a book kept for that purpose. A steady force of men is kept on duty to attend to these complaints, and they are at once looked after; the man going out to remedy any defect, writes his name opposite the complaint, and when the line is in good order again, he makes another entry, to show the real nature of the trouble, and the work done.

The repair shop and laboratory are situated in the rear of the manager's office, and are furnished with all necessary tools. The Toledo exchange gives employment to some thirty-five persons, the whole being under the management of Mr. Bernard.

There are fourteen operators, nine of whom are ladies. The line force consists of two inspectors, three linemen, and eleven construction men.

The system of designating subscribers by number instead of by name has lately come into vogue, greatly facilitates the speed of connections, and gives the greatest satisfaction.

Oaths and Kisses by Telephone.

THROUGH TWO MILES OF WIRE.

It became necessary on the 4th inst. for Dr. Townsend, the physician in charge of the Paterson smallpox hospital, and his five assistants, to take oath to their accounts in order that the bills might be presented to the meeting of the Aldermen. It was thought imprudent to allow them to go down through the city to the Recorder's office, and on the other hand Recorder Greaves did not care to go to the hospital to administer the oath. After pondering the matter he decided to send Assistant City Physician Hurd to the hospital with the bills as his proxy. The Doctor got the hospital physician and assistants to sign the affidavits on the end of their bills and then hunted up a Bible.

When all had put their hands on the book, Dr. Hurd went to the telephone in the hospital office and called up "328," the number of the instrument in the Recorder's office, two miles away.

"Have they all got their hands on the book?" asked the Recorder.

"Yes, all ready," replied Dr. Hurd.

"Very well, then," said the Recorder; "you as my deputy repeat to the deponents what I say. You and each of you do solemnly swear——"

"You and each of you do solemnly swear——" repeated Dr. Hurd.

"That the annexed accounts are just, true and unpaid——" said the Recorder through the telephone.

"That the annexed accounts are just, true and unpaid," repeated the Doctor.

"So help you God," said the Recorder through the telephone.

"So help you God," repeated Dr. Hurd.

"Now kiss the book." said the telephone.

"Kiss the book," repeated the Doctor.

The six hospital attaches kissed the Bible in turn.

"They've all kissed it," said the Doctor, through the telephone.

"They have?" answered the Recorder in surprise. "Why, I didn't hear it. Let them kiss it again loud enough for me to hear it."

The kisses were repeated with an energy that sent the reports vibrating over the wire vigorously enough to be reproduced on the metallic disk at the receiving end.

"I heard those. That's all right; good-by," said the Recorder, hanging up his earpiece.

A short time afterward Dr. Hurd drove up to the station house and laid the affidavits before the Recorder, all properly signed, and the Recorder affixed his own signature, certifying that they had been "sworn and subscribed before him."

Last night these bills went in with the other claims against the city, and were duly referred to the Finance Committee to be audited.

The Telephone and Earth Currents.

In his paper on the progress of the telephone read before the British Association at Southampton, Mr. W. H. Preece referred to the powerful currents which sometimes traverse telephone lines and interfere with their working. That these currents may be also fraught with danger is proved by two recent accidents, one at the Strasburg Cathedral, in which a fireman using a telephone was partially stunned while the instrument blazed up in his hands. A somewhat similar occurrence is also reported from Philadelphia, where a gentleman in the act of speaking into a transmitter had his forehead pulled as by a claw, and lost his senses for half an hour. When he recovered he found his watch totally deranged. The former mishap occurred during a thunderstorm, but the latter during clear weather. These accidents show that it is advisable to have an arrestor in the

telephone circuit. While upon this subject we may mention that the London, Globe and Maintenance Telephone Company have obtained a license to commence opening exchanges in this country.—*Engineering.*

An Angry Party.

A TRIP ACROSS THE SAND BAR OF THE MISSOURI, FORCED AND UNPLEASANT.

Mr. Smith and Mr. Knight, of the telephone service in this section, and Mr. Foster, of the Boston Ideals, came up to Leavenworth yesterday from Kansas City *via* the Council Bluffs route. For some reason or another the 'bus was unable to meet the train, and the party had to walk from the depot across the sand bar, covered with snow, to the ferry. They lost their way several times, and a stiff wind would often blind them with a mixture of sand and snow. Once or twice they despaired of ever again seeing friends and kindred, quails and champagne cocktails, and the prayers they murmured were long and earnest. Gen. Smith, thinking death was nigh, made a solemn promise that if he lived those unsightly Poles would be removed from the North. Esplanade, and Foster, in the midst of his peccavis, was heard to swear that if saved this time no more would he corner poor, inoffensive journalists and recite to them the history the struggles and the triumphs (of course) of each and every member of the Ideals, from Whitney or Stone down to the humblest choral singer. They still live, and their pledges are placed on record in the hope that they will not be violated.

Mr. Dorman Bristol, formerly a superintendent of construction of the Western Union Telegraph Company, and widely known throughout the country, has accepted a similar position with the City and Suburban Telegraph and Telephone Company, of Cincinnati.

Oscar Wilde lost his trunk while on a lecturing tour last fall, and his legs were in a state of perturbation painful to see. "'Ere, 'Arry! 'Arry! 'Ere's a jolly go, I say! I 'ave the brawses for the luggage, and the blooming conductor 'as gone and shunted the luggage van off on another line, don't you know! Blawst the bloody luck of it; I cawn't see anything in this howling country but trouble, you know."

Value of Government Property.

Probably but a very few persons realize the aggregate value of the Government property located at our capital. A correspondent of the New York *Tribune* communicates from Washington a transcript from the official assessment, in which it appears that the Capitol building is assessed at $15,699,556, and the grounds at $7,907,595; the White House at $734,590, and the Executive stables at $28,500. The Treasury Department building and grounds are assessed at $7,008,454; the State, War and Navy Department buildings, $6,211,161; the Agricultural Department building, $331,825, and the grounds, $689,086; the Smithsonian, $492,651, and National Museum, $250,000, and the grounds, $2,553,378; the National Monument grounds, $1,815,781, and the Washington Monument, $300,000; the National Observatory grounds, $125,861, and the building, $255,284; the Patent Office building and grounds, $3,754,883; the Arsenal buildings, $233,324, and grounds, $1,221,607; the Marine Barracks ground, $31,235, and buildings, $329,637; the Naval Hospital, $7,198,128; Bureau of Engraving and Printing, grounds, $27,612, building, $327,537; Winder's building, used by Engineer's Bureau of the Army, $214,367; United States Medical Museum, $96,280; General Post Office, ground, $312,492, building, $2,124,500; Government Printing Office, $236,000; Judiciary Square and City Hall, $1,399,713; United States Jail, $525,550; United States Navy Yard, ground, $1,413,500, buildings and wharves, $3,615,808; Botanical Gardens, grounds, $1,462,251, buildings, $556,676, hot houses, $58,598. The Aqueduct is valued at $3,847,547, and water pipes and plugs, $172,276. The intersections of streets, circles and spaces are put down at $4,682,942. The Department of Justice, ground, $150,000, and building, $150,000; the Government Insane Asylum, $1,849,775; the Reform School $221,056; the Soldiers' Home, grounds, $333,947, buildings, $350,000; Naval Magazine, $95,000, the Georgetown Post Office and Custom House, $63,767.

Passing down Newspaper Row, in New York City, one morning, the late Horace Greeley met one of his readers, who very excitedly exclaimed, "Mr. Greeley, after the article you published this morning, I intend to stop your paper!" "Oh, no," said Mr. Greeley, "don't do that!" "Yes, my mind is made up; I shall stop the paper!" Late in the afternoon the two met again, when Greeley remarked, "Mr. Thomson, I am very glad you did not carry out your threat this morning. "What do you mean?" "Why, you said you were going to stop my paper." "And so I did; I went to the office and had it stopped." "You are surely mistaken. I have just come from there, and the press was running and business was booming." "Sir," said Thomson, very pompously, "I mean I intended to stop my subscription to your paper." "O, thunder!" ejaculated Greeley, "I thought you were going to stop the running of the paper and knock me out of a living. My friend, let me tell you something. One man is just a drop of water in the ocean. You didn't set the machinery of this world in motion, and you can't stop it; and when you are underneath the ground things upon the ground will wag on just the same as ever."

Mr. W. F. G. Shanks, who has been for many years the city editor of the New York *Tribune*, was seventeen years ago a copyist for the Associated Press in Louisville. During the war he became an army correspondent, and marched with Sherman to the sea.

Unclaimed Money at the Cape of Good Hope.

A list of persons who have died at the Cape of Good Hope, leaving sums of money more or less considerable, to which their "unknown heirs" are entitled, comprises some hundreds of names. The amount unclaimed is about £20,000, and the more noticeable items are the following:

Unknown heirs of William Moore	£582	2	9
Unknown heirs of Robert Waters	242	11	4
John Samuel Parlby	991	12	9
Unknown heirs of J. S. Eligood	508	12	8
Unknown heirs of William Tait	275	2	10
Unknown heirs of John Reid	371	0	2
William Stewart Scott	667	9	3
Ellen Copeland	222	9	8
Unknown heirs of Walter C. Lowe	404	11	6
Unknown heirs of Henry Buckton	456	14	2
Alfred Mandy	520	17	10
Unknown heirs of Donald James Stewart	700	0	0
The absent heirs of Henry Mills	186	1	2
The absent heirs of Mary Ann Grant	383	8	8

The list also includes many curious items, including the following:

Willem (alias William), liberated African	$25	0	0
Unknown heirs of Adonis (a Mantatee)	76	12	2
August (a Mantatee)	76	12	2
Simon of Malmesbury (a laborer)	20	9	0
James (alias Jim James)	12	9	6
Mjweli (a Mantatee)	62	6	4
Unknown heirs of Sam (a Fingo)	26	0	0
Unknown heirs of John Smith	21	6	8
The estate of the late Jim	5	3	5

Snakes in India last year killed no fewer than 18,670 human beings, while 2,759 people lost their lives by wild beasts. Further, 43,609 head of cattle were killed by the same agents, although, on the other hand, 254,968 snakes and 15,274 wild animals were destroyed in their turn.

J. L. Shirley, of Dallas county, Texas, went out hunting,, and, forgetting to take a supply of wads, used paper in lieu of them. Becoming interested in the sport, he forgot that he had $300 in paper money in the same pocket with his wadding, and, after shooting away over $50 in bills, found that he was, perhaps, the only man in the country who used greenbacks for wads.

Manhattan District Telegraph Company.

EXECUTIVE OFFICE, 35 VESEY STREET.

H. W. POPE, Vice-President and General Manager.

Directors—W. H. Woolverton, H. G. Pearson, H. W. Pope, Henry W. Gwinner, A. S. Dodd.

To the Public:

This Company is organized for the purpose of performing first-class Messenger Service. Its employes are the pioneers in the District Messenger business, and are interested personally in the welfare of the Company. New and attractive offices are being fitted up in various portions of the city, and many important changes and reforms will be made in the Service beneficial to the subscribers.

No charge will be made for connecting the call box, or for its use. The Messenger Service will be first-class in every particular, and at popular prices. Our call boxes are of improved design and best workmanship.

The frequent attempts to consolidate the existing District Companies and re establish a rental system, has resulted in our entering the field to maintain the principle of free call boxes and competition. Cab, carriage, baggage, express and coal orders and telegrams collected and delivered free.

Fire, Police and Messenger Service the most efficient and reliable.

For information address H. W. POPE,
Vice-President and General Manager,
35 Vesey street.

New York Electrical Society.

NEW YORK, Dec. 11, 1882.

There will be a meeting of this Society held in the rooms, corner Greenwich and Liberty streets, Friday, Dec. 15th, 1882, at 8 P. M.

Prof. Robert Spice, of Brooklyn, will deliver a lecture upon Static Induction.

A general attendance is desired, as the proposition to make the Library a circulating one, and other important questions will be discussed.

Members are at liberty to invite friends interested in electrical science

Complimentary tickets may be had by addressing,

J. M. MOFFATT, *Recording Secretary*, 195 Broadway.
F. W. JONES, *President*, 7 & 9 Bond St.

I had rather be a seed cucumber, flung on a woodpile to ripen, than to be an old bachelor.

An old bachelor is a traveler on life's railroad, who has failed to make the proper connections.

"Wanted, young ladies who can and will play at croquet without cheating."

Occasionally you read such advertisements as this: "Lost—A leathern lady's portmanteau."

Just a Little.

It is related that a Buffalo man who had been in the coffee business for several years was led to believe that he was a sinner, and to come out on the side of religion. The morning after he had taken this step he reached his factory to find business suspended, and upon demanding an explanation, his son replied:

"Well, father, I don't know what to do. I don't suppose after what you said last night that you would mix any more beans with the coffee. I presumed it would make a difference."

"Yes, it will make just a little difference," calmly observed the old man. "We have heretofore been mixing one barrel of beans to four of coffee, havent we?"

"Yes."

"Well, take out a few of the beans—about two quarts, I guess."

Hedges' Patent Shut Offs and Switches.

(From The Electrician, London.)

"These switches, which were first introduced by Mr. Killingworth Hedges at the Paris Electrical Exhibition, have been steadily increasing in favor ever since. About eight varieties are now made to suit the strength of the current, and the number of directions into which it it necessary to shunt the current. The tendency to spark, and consequent destruction which takes place at the moment of breaking contact, is considerably obviated in Mr. Hedges' plan of causing the contact piece to slide on to a block of highly insulating and non-inflammable material, such as vulcanized fiber. With switches designed for powerful currents the spark itself is considerably reduced by splitting the current into two or more portions. The current is increased by turning the handle to slide on to the set of contacts which are severally connected up to an increased number of cells of the secondary batteries These switches were used at the Crystal Palace Exhibition both with the Faure and Sellon-Volckmar batteries.

A report by Commissioner of Pensions, Dudley, gives the following statistics concerning the army during the war:

Total number of enlistments	2,780,178
Number counted more than once by reason of re-enlistment	716,878
Actual individual enlistments	2,063,291
Living who have not applied for pensions	1,009,469
Living who have applied for pensions	458,553
Dead leaving pensionable relatives who have not applied for pensions	86,803
Dead leaving pensionable relatives who have applied	297,566
Dead leaving no pensionable relatives	220,000
Died during the war	304,369
Discharged for disability	285,545
In the service May 1, 1865	1,000,516

The Western Union Company.

QUARTERLY REPORT.

The following are the most important parts of the quarterly report of the Western Union Telegraph Company adopted at a meeting of the Directors on the 13th inst.:

The net revenues for the quarter ending December 31 instant, based upon nearly completed returns for October, partial returns for November, and estimating the business for December, will be about.	$2,150,000 00
Add surplus October 1	2,667,097 33
	$4,817,097 33
From which, appropriating for—	
Interest on bonded debt $106,850 00	
Sinking funds 20,000 00	
	$126,850 00
Leaves a balance of	$4,69,0247 33
It requires for the payment of a dividend of 1½ per cent. on the capital stock	1,199,800 00
Deducting which leaves a surplus, after paying dividend, of	$3,490,447 33

The following resolutions were adopted:

Resolved, That a dividend of one and one-half per cent. from the net earnings of the three months ending December 31, be, and is hereby declared payable on the 15th day of January next, to stockholders of record, at the close of business on the 20th day of December instant.

Resolved, That for the purpose of such dividend, the stock books of the company be closed at 3 o'clock on the afternoon of the 20th day of December instant, and be reopened on the morning of the 16th of January next.

The resignation of George F. Baker, as Director, was received and S. Lowber Welsh, of Philadelphia, was elected to succeed him.

NEW PATENTS—ELECTRICAL—1882.

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING NOVEMBER 28TH, 1882.

WEEK ENDING OCT. 31, 1882.

266,703 Apparatus for treating carbon conductors, J. E. Lockwood, Paris, France.

266,855 Commutor-brush for dynamo-electric machines, W. B. Mason, Boston, Mass.

266,681 Conduit for electrical conductors, G. S. Eaton, Brooklyn, N. Y.

266,677 Conduit for electric lines, R. H. Corbett, New York, N. Y.

266,853 Connecting device for operators' telephones. L. Mann, Detroit, Mich.

266,798 Containing vessel for galvanic batteries, C. A. Faure, Paris, France.

266,793 Electric distribution system, T. A. Edison, Menlo Park, N. J.

266,904 Electric railway signaling apparatus, C A. Scott, Boston, Mass.

266,954 Implement for closing and testing electric circuits, L. Mann, Detroit, Mich.

266,741 Incandescent electric lamp, E. Weston, Newark, N. J.

266,740 Magneto or dynamo-electric machine, E. Weston, Newark, N. J.

266,762 Making electrodes for secondary batteries, C. F. Brush, Cleveland, O.

266,806 Railway train electric signaling apparatus, E. T. Gilliland, Indianapolis, Ind.

266,910-11 Rheostat, E. T. Starr, Philadelphia, Pa. (two-patents.)

266,808 Safety or cut-off switch, E. T. Greenfield, New York, N. Y.

266,739 Shunting device for electric lamps, E. Weston, Newark, N. J.

266,750 Telephone switch, S. Bergmann, New York, N. Y.

266,615 Telephone transmitter, D. Drawbaugh, Eberly's Mill, Pa.

266,746 Telephonic receiver, S. E. Beedy, Farmington, Me.

266,747 Telephonic transmitter, S. E. Beedy, Farmington, Me.

WEEK ENDING NOV. 7, 1882.

266,969 Chandelier for electric candles, C. A. Cheever, New York, and W. L. Candee, Brooklyn.

267,299 Clock for making electric signals, W. R. Wilson. New Haven, Conn.

267,136 Dynamo-electric machine, V. W. Blanchard, New York, N. Y.

267,196 Dynamo-electric machine, E. J. Harling and E. Hartman, London, Eng.

266,993 Dynamo-electric machine, P. Jablochkoff, Paris, France.

267,263 Dynamo-Electric machine, G. A. Schaeffer, Evansville, Ind.

267,155 Electric arc lamp, C. A. Cooley, New Britain, Conn.

267,059 Electric circuit for telephone systems, J. W. Brennan, Chicago, Ill.

267,059 Electric switch and circuit for telephone systems, J. W. Brennan, Chicago, Ill.

267,138 Electro-magnet, V. W. Blanchard, New York, N.Y.

267,259 Electro-pneumatic gate and signal operating apparatus, W. Robinson, Boston, Mass.

267,025 Electro-therapeutic apparatus, J. W. See, Hamilton, O.

267,046 Insulating compound for electric wires, R. S. Waring, Pittsburgh, Pa.

267,045 Insulating material for electric uses, R. S. Waring, Pittsburgh, Pa., and J. B. Hyde, New York, N. Y.

267,208 Mechanical telephone, H. E. Huston. Monticello, Ill.

267,278-9 Metallic circuit for electric currents, S. D. Strohm.

267,044 Process of and apparatus for insulating wires for electric uses, R. S. Waring, Pittsburgh, Pa., and J. B. Hyde, New York, N. Y.

10,232 Railway car telegraph, J. R. Finney, Pittsburgh, Pa. (Re-issue.)

267,137 Secondary battery, V. W. Blanchard, New York, N. Y,

267,275 Secondary battery, E. T. Starr, Philadelphia, Pa.

266,987 Ship telegraph, J. S. Gisborne, Charing Cross, County of Middlesex, Eng.

267,144 Telegraph switch, R. Brougham, Eng.

267,115 Tower for electric lights, etc , C. D. F. Smith, Aurora, Ill.

WEEK ENDING NOV. 14, 1882.

267,409 Conduit for underground lines, W. B. Eltonhead, Philadelphia, Pa.

267,458 Electrical igniting device for gas-engines, A. K. Rider, Walden, N. Y.

267,553 Electric-arc lamp, N. McCarty, Brooklyn, N. Y.

267,474 Electric-arc lamp, E. Weston, Newark, N. J.

267,446 Electric governor for driving engines for dynamo-electric machines, S. D. Mott, Menlo Park, N. J.

267,437 Electric station-indicator, J. F. Loughlin, Hyde Park, Mass.

267,319 Galvanic battery, A. Bernstein, Berlin, Ger.

267,577 Galvanic battery, G. W. O'Harra, Kalamazoo, Mich.

267,647 Incandescent electric lamp, A. H. Emmens, London, Eng.

267,597 Machine for the manufacture of electric cables, W. H. Sawyer, Providence, R. I.

267,445 Measuring electric currents, S. D. Mott, New York, N. Y.

267,366 Printing telegraph, G. M. Phelps, Brooklyn, N. Y.

267,609 Telegraph cable, C. J. Slafter, Grand Junction, Mich.

267,387 Telephone system, T. A. Watson, Everett, Mass.

WEEK ENDING NOV. 21, 1882.

267,711 Commutator for electrical apparatus, C. C. Peck and W. H. Chapman, Middlebury, Vt.

267,859 Dynamo-electric machine regulator, J. R. Finney, Pittsburg. Pa.

267,807 Electrical annunciator, F. Tanner, Detroit, Mich.

267,685 Electrical apparatus for preserving meats, Anderson Fowler, New York, N. Y

267,987 Electrical burglar-alarm, C. A. E. Ruebel, Chillicothe, O.

267,710 Electric pumping apparatus. Charles C. Peck and W. H. Chapman, Middlebury, Vt.

267,747 Electrical switch-board, J. F. Gilliland, Indianapolis, Ind.

267,691 Electric-arc lamp, C. A. Hussey, New York, N. Y.

267,978-9 Electric railway signal apparatus, O. Gassett, Boston, Mass.

267,945 Electric signaling apparatus, H. W. Southworth Springfield, Mass.

267,897 Mechanical telephone, H. J. Johnson, Scio, N. Y.

267,860 Secondary battery, J. R Finney, Pittsburgh, Pa.

267,804 Secondary battery, E. T. Starr, Philadelphia, Pa.

267,929 Telegraphic register, F. L. Pope, Elizabeth, N. J.

267,878 Telegraphic key, J. T. Guthrie, Leesburg, O.

267,893 Telegraph sounder, J. H. Bunnell, New York, N. Y.

267,905 Telephone exchange and apparatus therefor, H Lartigue, Paris, France.

267,790 Telephone system, W. A. Jackson and W. R. Cole, Detroit, Mich.

267,883 Underground telegraph line, C. H. Hansen, Washington, D. C.

WEEK ENDING NOV. 28, 1882.

268,175 Apparatus for charging electric storage batteries, V. W. Blanchard, New York, N. Y.

268,317 Condenser for telegraphic circuits, B. Thompson, Buffalo, N. Y.

268,324 Dividing and branching electric cables, R. S. Waring, Pittsburgh, Pa.

268,255 Dynamo-electric machine, R. H. Mather, Windsor, Conn.

268,331 Dynamo-electric machine, E. Weston, Newark, N. J.

268,205 Dynamo or magneto-electric machine, Thos. A. Edison, Menlo Park, N. J.

268,269 Electric incandescent lamp, J. V. Nichols, Brooklyn, N. Y.
268,270 Electric incandescent lamp, J. V. Nichols, Brooklyn, N. Y.
268,206 Electric incandescent lamp, T. A. Edison, Menlo Park, N. J.
268,329 Incandescent lamp holder, E. Weston, Newark, N. J.
268,330 Incandescent electric lamp holder, E. Weston, Newark, N. J.
268,031 Increasing and reducing joint for electric wire conduits, C. Linford, Pittsburgh, Pa.
268,158 Lead-armored electric cable, R. S. Waring, Pittsburgh, Pa.
268,099 Magneto-electric machine, O. Heikel, Jersey City, N. J.
268,034 Manufacture of insulating compounds, M. Mackay, London, England.
268,237 Printing telegraph, A. B. and F. B. Johnson, Brooklyn, N. Y.
268,360 Secondary battery, A. K. Eaton, Brooklyn, N. Y.
268,308 Secondary battery, E. T. and E. E. Starr, Philadelphia, Pa.
268,059 Submarine electric cable, R. S. Waring, Pittsburgh, Pa.
268,294 Telephone exchange system and apparatus, J. H. Rogers, New York, N. Y.
268,045 Telephone toll apparatus, J. W. See, Hamilton, O.
268,359 Telephone apparatus, W. J. Dudley, Boston, Mass.
268,159 Uniting and branching electric cables, R. S. Waring, Pittsburgh, Pa.

The Stock Quotation Telegraph Company of New York, capital $1,000,000, the line to run through the city of New York and elsewhere if it is thought necessary.

NOW READY.

Secondary Batteries.

Their History, and Description of various and desirable forms untrammelled by Patents, and how to use them.

Price $1.00, by Mail.

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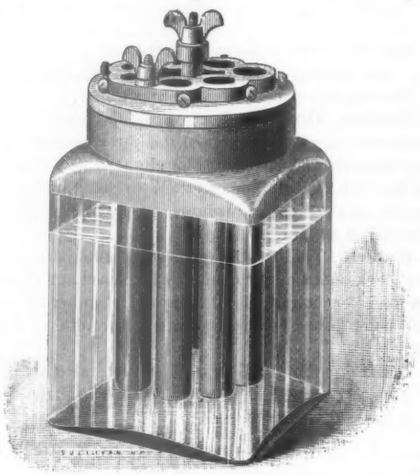
THE "DIAMOND"
Carbon Telephone Battery.



[PATENT APPLIED FOR.]
Jar, 6 inches high, 4 inches square.
FITS ANY TELEPHONE BOX.

HAS MORE THAN
Double the Carbon Surface
OF ANY OTHER BATTERY.
EXCELS FOR
Constancy, Simplicity and Price.

ELEMENTS.

7 Sticks Round Carbon, ⅝ in. diameter, 5½ in. long.
Amalgamated Zinc, ⅜ diam.
Sal ammoniac.

Price Complete, $1.25 per Cell.

Subject to Liberal Discount in Quantities.

[FAC SIMILE OF LABEL, REDUCED IN SIZE.]

THE "DIAMOND" CARBON BATTERY

DIRECTIONS.

1.—Place in the Jar six ounces best Sal Ammoniac, which thoroughly dissolve, filling with water to the shoulder of the jar.
2.—See that the cover fits as nearly air tight as possible, and that the rubber on the zinc rests on the top of the glass.
3.—Keep in a dry place if possible, be careful that a good, firm, clean contact is made.

NOTICE!

As every part of this Battery except the glass, is made at our own Factories, we warrant the quality, and purchasers may be assured of uniformity and carefulness in manufacture.
This Battery has more than double the Carbon surface of any other, and the small parts to get out of order are lost; it is also easily and cheaply renewed.

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We guarantee against loss. A new District Telegraph Company is about to be organized in an excellent field. A limited number of shares will be sold, at a very low figure, to telegraph and telephone employes.

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CAPITAL STOCK, - $100,000.

SHARES $10 EACH.

FULL PAID AND NON-ASSESSABLE.

This Company has acquired and owns *all* the telephonic rights formerly the property of the American Bell Telephone Company, Continental Telephone Company, and the Tropical American Telephone Company, Limited, in **Central America** and **Panama.**

The Company **BUYS** its telephones and transmitters, and thereby avoids paying royalties.

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IN USE FOR

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PRICE, $1.50 PER CELL.

LIBERAL DISCOUNT TO THE TRADE.

PARTRICK & CARTER,

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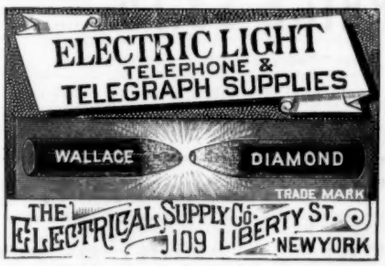

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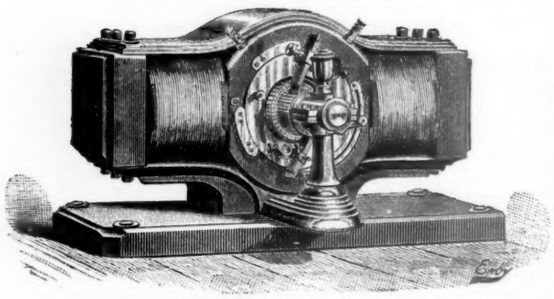

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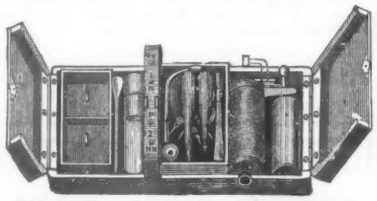

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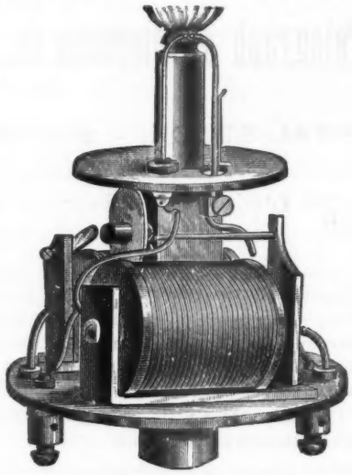

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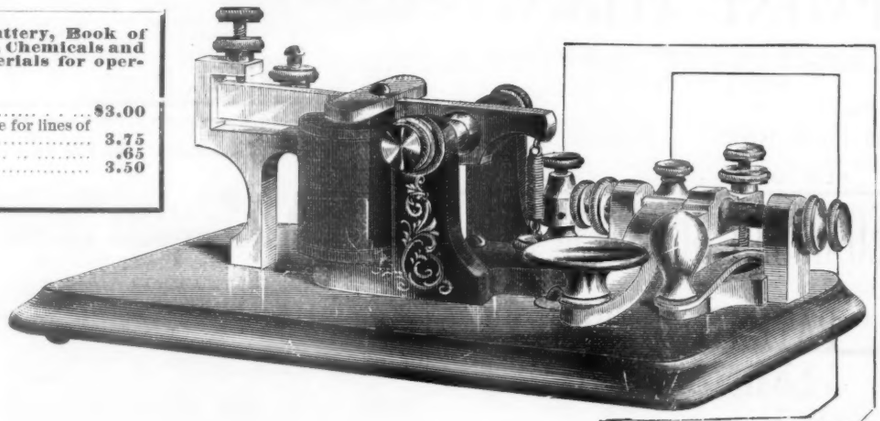

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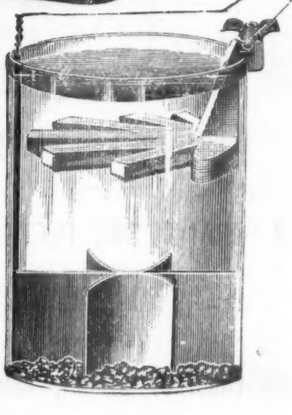

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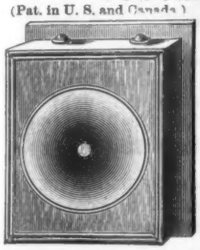

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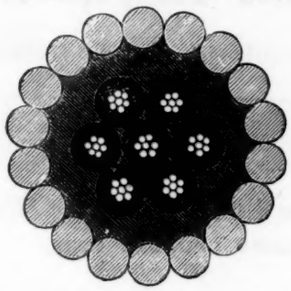

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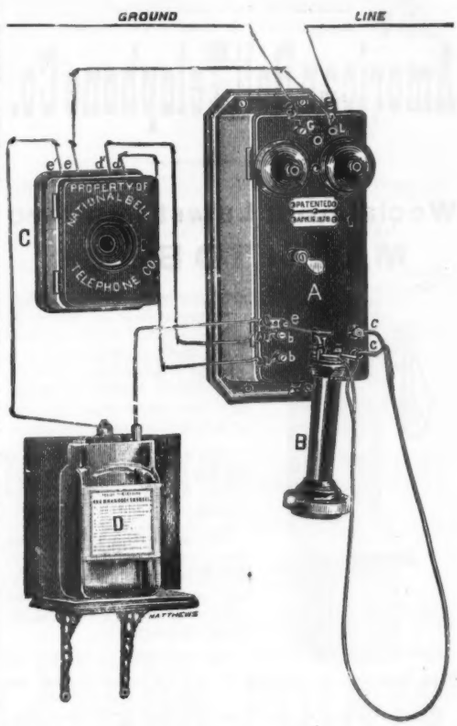

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